

## ABSTRACT OF THE DISCLOSURE

A hydrogen separation filter includes a plurality of hydrogen extraction layers, a plurality of separation layers with hydrogen separation films, and a plurality of reformed gas layers, which are 5 laid one upon another in the sequence of the extraction layer, the separation layer, the reformed gas layer, and the separation layer to form a laminate structure. The respective layers are composed of porous ceramic material to ensure the required strength. The direction of the gas flow in the reformed gas layers and that in the 10 extraction layers are respectively fixed to simplify the gas intake and discharge structure. The hydrogen separation filter is covered with a casing via a cushioning member to ensure the sufficient strength and the required sealing properties. A methanation catalyst that accelerates methanation of carbon monoxide is carried on either the 15 separation layer or the extraction layer. This arrangement effectively relieves the adverse effects of contamination of resulting hydrogen with carbon monoxide, due to a pinhole or a partial damage of the layers.